

Four electrons transport of a supercurrent in Josephson junction and anharmonic dependence by a current -phase

D. Sergeyev and K. Shunkeyev

Aktobe State Pedagogical Institute, Aktobe, Kazakhstan

In work the hypothesis about $4e$ transport of a supercurrent in Josephson junction (JJ) is offered by much lower critical temperature. In work ¹ the microscopic theory of persistence pair Bose-Einstein condensation (PBEC) is considered. As known, that there is a model of considering superconducting transition, as BEC. In our case, PBEC - bi-Cooper pairs consisting from two Cooper pairs. It is determined, that at $4e$ realization of transport of a supercurrent in JJ the current - phase dependence becomes anharmonic. It is shown, that in result $4e$ transport of a supercurrent in JJ is observed occurrence half-integral of Shapiro's steps on current-voltage characteristic under action of a microwave of a signal, increase of size of plasma frequency, occurrence in dependence a current - flux of minima at fractional meanings of the normalized magnetic flow.

¹S.Dzhumanov, Solid State Communications. **115**, 155 (2000).